**Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Unit 10: Redox & Electrochemistry**

Place a checkmark next to each item that you can do! If a sample problem is given, complete it as evidence.

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| **\_\_\_\_\_1. I can define oxidation, reduction, and redox reaction** | | **Definitions:**  oxidation  reduction  redox reaction |
| **\_\_\_\_\_2. I can assign oxidation numbers to any element.** | | Assign oxidation number to each of the elements below.  O2\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Li\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Si\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **\_\_\_\_\_3. I can assign oxidation numbers to the elements in a compound.** | | Assign oxidation numbers to each element in the compounds below.  MnCl3: Mn\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Cl\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  H2SO4: H\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ S\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ O\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Fe(NO3)2 Fe: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ N: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ O: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **\_\_\_\_\_4. I can assign oxidation numbers to the elements in a polyatomic ion.** | | Assign oxidation numbers to each element in the polyatomic ions below.  PO43-: P\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_O\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  ClO3-: Cl\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_O\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **\_\_\_\_\_5. I can distinguish between an oxidation half-reaction and a reduction half-reaction.** | Which half-reaction equation represents the reduction of a potassium ion?  A) K+ + e- -----> K C) K+ -----> K + e-  B) K + e- -----> K+ D) K -----> K+ + e-  Given the reaction:  Fe(s) + Cu 2+ (aq) 🡪 Fe 2+ (aq) + Cu(s)  Which half reaction correctly shows the oxidation that occurs?  A) Fe(s) 🡪 Fe2+ (aq) + 2e- (C) Cu2+ (aq) 🡪 Cu(s) + 2e-  B) Fe(s) + 2e- 🡪 Fe2+ (aq) D) Cu2+ (aq) + 2 e- 🡪 Cu(s) | |
| **\_\_\_\_\_6. I can state the Law of Conservation of Charge.** | The law of Conservation of Charge states…………… | |
| **\_\_\_\_\_7. I can break a redox reaction into its two half-reactions.** | The two half-reactions that come from the following equation are:  Cr(s) + CuCl2(aq) -----> CrCl3(aq) + Cu(s)  oxidation half-reaction  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  reduction half-reaction  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Li(s) + Ag+(aq) -----> Li+(aq) + Ag(s)  oxidation half-reaction  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  reduction half-reaction  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| **\_\_\_\_\_8. I can balance the two half reactions and create a balanced redox reaction** | Al(s) + FeCl2(aq) -----> AlCl3(aq) + Fe(s)  oxidation half-reaction  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  reduction half-reaction  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Balanced Redox Reaction  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| **\_\_\_\_\_9. I can balance a redox reaction.** | Given the reaction:  \_\_\_\_\_Cl2(g) + \_\_\_\_\_Fe(aq) -----> \_\_\_\_\_Fe+3(s) + \_\_\_\_\_Cl-(aq)  When the equation is correctly balanced using smallest whole numbers, the coefficient of Cl- will be  A) 1 B) 2 C) 6 D) 7 | |
| **\_\_\_\_\_10. I can identify a redox reaction from a list of chemical reactions.** |  | |
| **\_\_\_\_\_11. From a list of given list of elements, I can determine which element is most active.** | Which of the following elements is most likely to react?  A) Cu C) Li  B) Al D) Mg | |
| **\_\_\_\_\_12. I can state the two types of electrochemical cells.** | The two types of electrochemical cells are:  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| **\_\_\_\_\_13. I can label the following on a voltaic cell: anode, cathode, site of oxidation, site of reduction, electron flow, positive electrode, negative electrode, salt bridge, voltmeter, aqueous solutions** | Mg Ni | |
| **\_\_\_\_\_14. I can state the purpose of the salt bridge in a voltaic cell.** | **The purpose of the salt bridge is** | |
| **\_\_\_\_\_15. Given a voltaic (electrochemical) cell, I can predict the direction of electron flow.** |  | |
| **\_\_\_\_\_16. I can explain, in terms of atoms and ions, the changes in mass that take place at the anode and cathode of a voltaic cell.** | Explain, in terms of atoms and ions, why the mass of the cathode increases during the operation of a voltaic (electrochemical) cell.  Explain, in terms of atoms and ions, why the mass of the anode decreases during the operation of a voltaic (electrochemical) cell. | |
| **\_\_\_\_\_17. I can label the following on a electrolytic cell: anode, cathode, site of oxidation, site of reduction, electron flow, positive electrode, negative electrode, battery, aqueous solution** |  | |
| **\_\_\_\_\_18. I can explain the process of electroplating** | **Given Ni (s) and Ni+2 (aq) ions, write out the oxidation and reduction half reactions that would occur when electroplating.**  **Oxidation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **Reduction: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** | |
| **\_\_\_\_\_19. I can compare the two types of electrochemical cells in terms of: number of containers, location of oxidation, location of reduction, direction of electron flow, conversion between electrical and chemical energy, and spontaneity of reaction.** | |  |  |  | | --- | --- | --- | |  | **Voltaic** | **Electrolytic** | | **Number of containers** |  |  | | **Oxidation occurs at the:** |  |  | | **Reduction occurs at the:** |  |  | | **Anode charge** |  |  | | **Cathode charge** |  |  | | **Electrons flow from** |  |  | | **Energy conversion that occurs in this cell** |  |  | | **Is this reaction spontaneous or does it require an outside power source to happen?** |  |  | | |